

INFECTION CONTROL AND CLINICAL MICROBIOLOGY

September 25-26, 2017 Chicago, USA

Carbapenemase production in hospital isolates of multidrug-resistant *Klebsiella pneumoniae* in Sudan

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Background: Antibiotic non susceptible Bacteria have been increased and disseminated all over the world. So this resistant strain with treatment difficulty may threaten the Patients lives. However the last line of treatment for such infection is antibiotic from Carbapenem family (1). One of the most virulence bacteria with pandrug resistant is *Klebsiella pneumoniae* which associated with high associated with morbidity and mortality (2). In this study, the phenotypic and genotypic features of carbapenem-resistant *K. pneumoniae* strains isolated in some Sudanese hospitals were studied.

Methodology: Strains of *K. pneumoniae* resistant to at least one carbapenem (imipenem or meropenem) were collected from May, 2015 to January, 2017. Isolates were obtained from clinical samples of patients treated inside the hospitals. Carbapenem resistance was confirmed using modified Hodge test (MHT) as phenotypic test and real-time PCR for genotypic detection.

Findings: A total 96 strains of *K. pneumoniae* of different non duplicated isolates were obtained from following samples; urine (47), wound swab (22), sputum (16), stool (3), CSF (1), HVS (4), seminal fluid (1), peritoneal (1) and blood. All these isolates were found to be resistant to carbapenem by disc sensitivity test and modified Hodge test (MHT) revealed 63 (65.6%) isolates were carbapenemase producers. Seventy-two percent (70/96) isolates were positive for carbapenemase genes; 59.4% (57/96) were positive for *blaKPC* genes, 57.3% (55/96) were positive for *blaNDM* genes, 37.5% (36/96) were positive for *blaVIM* genes and 35.4% (34/96) were positive for *blaOXA-48* genes. Nineteen isolates possessed four genes (*blaKPC*, *blaNDM*, *blaVIM* and *blaOXA-48*), fourteen isolates possessed three genes (*blaNDM*, *blaVIM* and *blaOXA-48=6*), (*blaKPC*, *blaNDM*, and *blaOXA-48=3*), (*blaKPC*, *blaNDM* and *blaVIM=3*), (*blaKPC*, *blaVIM* and *blaOXA-48=2*), 27 isolates possessed two genes (*blaKPC* and *blaNDM=21*), (*blaKPC*, *blaOXA-48=2*), (*blaNDM* and *blaVIM=3*), (*blaNDM* and *blaOXA-48=1*), 10 isolates possessed only one gene (*blaKPC=8*, *blaOXA-48=1* and *blaVIM=1*) and the remaining 26 isolates were free from these genes.

Conclusion & Recommendation: In Sudan, the most common type of carbapenemase gene multidrug-resistant *K. pneumoniae* is KPC. Co-production of KPC, VIM, NDM and OXA-48 genes are found in *K. pneumoniae*. To our knowledge, this study was done for the first time in Sudan. Therefore, it is necessary to determine carbapenem resistance in *K. pneumoniae* isolates and take essential infection control precautions to avoid spread of this resistance.

Biography

Abdelhakam Hassan is a Technologist and is working as a Lecturer of Medical Microbiology (bacteriology, mycology, virology and molecular biology) who rapidly learnt all the aspects related to his study. He has more than four years' experiences in the field of drug resistance. He has done his MSc complementary research in the extended spectrum β -lactamase in *K. pneumoniae* (ESBL).

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